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Registered March 25th
1825

An Essay
On Yellow Fever
by
John Aikens
of
Pennsylvania

1852
October 22

My dear Mr. May
I have just received
your letter of the 19th
and am very glad to hear
from you. I am well
and hope these few lines
will find you the same.
I have not much news
to write at present.

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Introductory Remarks

We owe to the Study of History & especially to that of Medicine the Knowledge of several extraordinary Diseases, which by turns and at divers intervals have overrun the globe & afflicted the Human Species: different in their principles, they ought to have, & have had different effects; some owing to local & accidental circumstances have had but a transitory existence & have disappeared with the causes that gave birth to them; others produced by a defect which if the exposure may be allowed is identified with our being, have exercised a more profound, durable & fatal influence on the Animal economy; it is to the Healing art that we owe the attenuation of some & the cessation of others; but if its efforts are always useful & often successful in combating a Disease, when it has manifested

Introduction

The first object of this volume is to present a complete and accurate account of the history of the United States from the first settlement to the present time. It is intended to be a history of the United States as it is, and not as it might have been. It is intended to be a history of the United States as it is, and not as it might have been. It is intended to be a history of the United States as it is, and not as it might have been.

itself, they are impotent & of no effect against the
 Force of Nature, which changes, modifies, preserves
 a destiny according to our conformity to her. Con-
 tinual reaction observed by Antiquity the Ancients
 who made a religious dogma of it, personified by the
 supposed wrestle of the good & bad principle which
 is the allegory of it; a reaction whose effects may
 be easily modulated, but ^{not} determine whose laws to
 destroy the cause is impossible; Conquered under
 one form she appears under another, subdued
 in one place, it diffuses itself in another; no disease
 not even the plague has sacrificed so many victims
 & now inspires such just dread, none would demand
 more the indefatigable zeal & attention of the
 Physician; none demands with more force and
 justice the vigilance & attention of a Magistrate,
 The Knowledge of the nature of this scourge is
 a problem so important to solve, acquires by reason
 of its proximity, an interest which is becoming daily

more pressing; I do not pretend to dispel all
 the doubts with respect to it, but propose to
 offer with due circumspection, a few reflections
 that may throw some light on the subject
 as obscure as it is important; I hope that on
 reading them, it will be readily perceived that
 my only aim has been the desire to be any
 useful

The first of these is the
the second is the
the third is the
the fourth is the
the fifth is the
the sixth is the
the seventh is the
the eighth is the
the ninth is the
the tenth is the

General Characters

The Yellow Fever presents some principal features, essential phenomena, inseparable & distinct from this Disease, that the difference of places may attenuate but can never entirely destroy.

1st It is not capable of developing itself but in a certain determinate temperature

2nd It is circumscribed particularly in the temperate Zone & the bosom of large cities

3rd It does not attack persons who have once had it, provided they do not remove to a

warmer climate & then again return to the Islands. — These three characters

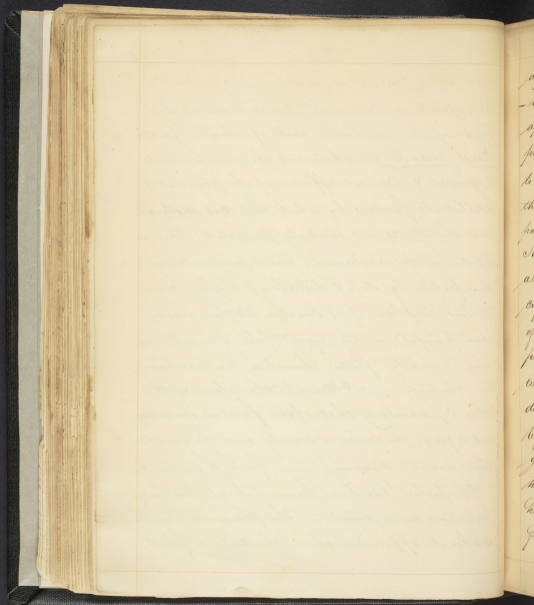
with the exception of some slight modifications applicable to the climates of the Torrid Zone, as well as to those of the Temperate, make the Yellow Fever a Disease of itself

Symptoms of the Yellow Fever.

Although the Yellow Fever runs its course

in a short time, it is nevertheless essential to distinguish in its march two periods marked by symptoms peculiar to each of them. In the First period we observe at the commencement a general & common affection of the physical & intellectual faculties by which the vis motrix and the spirits are suddenly prostrated; terror is depicted in the countenance, this is particularly manifested by deep & distressing sighs; most persons complain of a sensation rather uneasy than painful, in the region of the stomach, this they generally flatter themselves can be relieved by vomiting. — Although the colour of the skin & particularly that of the face is sometimes red & fiery, the pulse is scarcely more frequent than usual; drowsiness never fails to succeed it.

The pulse has been known to beat, but forty pulsations in a minute — This phenomenon usually makes its appearance about the third or fourth



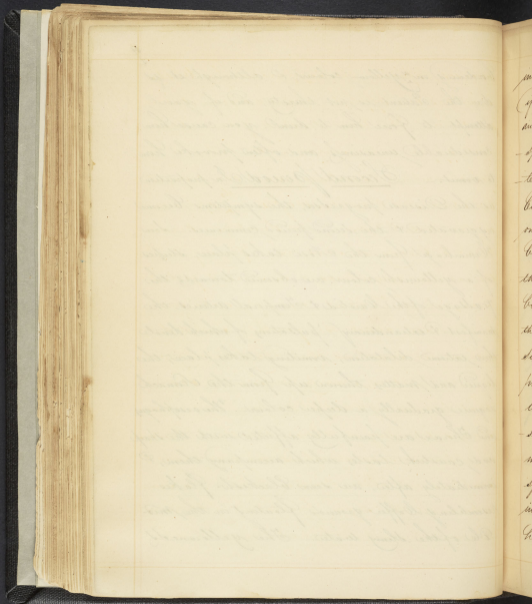
day - It even appears that the Arterial
 - tation by its want of elasticity, forbodes the
 approaching decomposition of the Constitutive
 principles of the Blood; one would be induced
 to believe that it was not a liquid, but even
 that, circulated in the Arteries. - dull & sharp
 pains at intervals are felt in the Loins, Knees,
 Sockets of the eyes, & in the nape of the neck, &
 although they force at times the Patient to
 cry out, they do not revive him from the species
 of Comatose affection into which he is often
 plunged; when he is spoken to, he, replies
 with difficulty; his eyes wander & he appears
 distressed; the light is unpleasant to him, the
 vessels of the Conjunctiva are engorged, the
 gums become dry; if you attempt to open his
 mouth his under-lip trembles & with difficulty
 he can put out his tongue, which is generally
 found incrustated with a tenacious slime.

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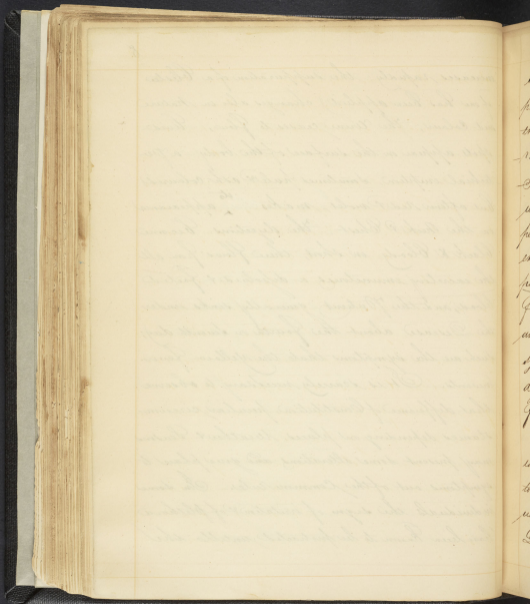
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bordering on a yellow colour, & although it is dry the Patient is not thirsty, and if you attempt to force him to drink, you cause him considerable uneasiness, and often provoke him to vomit. — Second period. In proportion

as the Disease progresses, the symptoms become aggravated & the second period commences. Some Hemorrhage from the Nose takes place, streaks of a yellowish colour are observed towards the passage of the Carotid & Temporal arteries, the manifest & extraordinary pulsations of which denote their extreme dilatation; vomiting takes place, the liquid and mucus thrown up from the Stomach acquire gradually a deeper colour. The oesophagus and Thorax are painfully affected with the sharp and caustic tastes which accompany them, & immediately after, are seen blackish flakes resembling Coffee grounds floating in the middle of the slimy water. The yellowness of

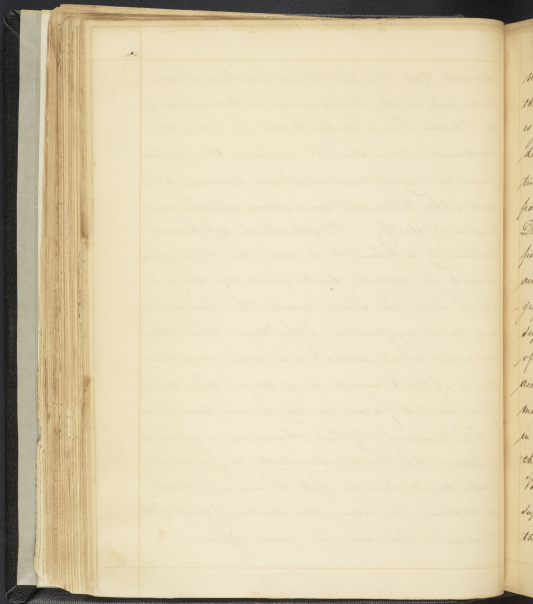


increases rapidly; the suppuration of a Clotter
 (if one has been applied) changes also in Nature
 and Colour; the Urine ceases to flow, Livid-
 spots appear on the surface of the body—a pe-
 techial eruption, sometimes pale & ash coloured,
 but often red & violet, makes ^{its} appearance
 on the Neck & Chest: The dejections become
 black & bloody, in short, there flows from all
 the excretory emunctories a discoloured & foetid
 blood, and the Patient generally sinks under
 the Disease about the Fourth or sixth day;
 such are the symptoms that the yellow Fever
 presents.—It is scarcely necessary to observe
 that difference of Constitution, peculiar circum-
 stances depending on places, Weather & Seasons
 may present some alterations and give place to
 symptoms out of the common rule.—In some
 individuals the signs of irritation & of plethora
 have been known to be protracted, untill the



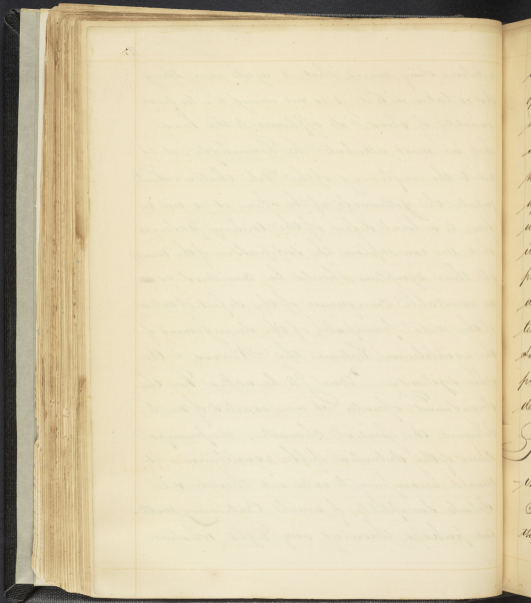
Seventh day, this observation has been made particularly at the Commencement or termination of the Epidemic - Similar to all the other derangements of the animal economy, the Yellow Fever has symptoms which are common to it with other Diseases, and others which are peculiar to itself. - Those which appear exclusively to belong to it, are, the return of the pulse to its natural state about the third, or fourth day, the black vomit, & the spontaneous and total suppression of the urine; These three symptoms which indicate the most violent degree of the Disease are so much the more formidable & fatal as they become concentrated.

The name of Yellow-Fever under which it is known, has the disadvantage of presenting to the mind but one of its Phenomenon & teaches us nothing respecting the nature & Seat of the Disease. - The name of Fever essentially



nervous & malignant, appears to me so much
 the more proper, to give an exact idea of it, & it
 is generally agreed to thus call all Fevers of a
 dangerous character. - If this qualification is
 truly that which best accords with them, it is
 particularly to the Yellow Fever, as an essential
 Disease of the Nervous System, that it is
 peculiarly applicable; indeed it is difficult to
 account for this variety of symptoms, the con-
 gregation of which seems impossible, without
 supposing a general & extraordinary alteration
 of the vital principle; how otherwise to
 account for the simultaneous appearance of so
 many frightful symptoms that are met with
 in this Disease, the result of which is always
 the decomposition of the Animal economy. - The
 Vomiting, Hemorrhage, the yellowness & the
 suppression of the Urine, are but the effects of
 them. - It is not because the Stomach contains

a bilious slimy mucous, that it rejects every thing that is taken in to it, it is not owing to a too great quantity of Blood, & its affluence to the Head that we must attribute the Hemorrhage; it is not to the overflowing of the Bile that we should impute the yellowness of the skin; it is not in fine, to a local defect of the Urinary Passages that we can explain the suppression of the Urine; all these symptoms should be considered as an inevitable consequence of the defect of action of the vital principle, of the derangement of the equilibrium between the Nervous & the other systems. — Were it to be asked how this derangement operates, & it were exacted of me to determine the essential Character, the principal Cause of the destruction of the equilibrium, it would be necessary to enter into theoretical details, susceptible of much Controversy without perhaps throwing any light whatever



on the Disease itself. For, whoever has had an opportunity of observing this Disease, its nature is admitted & rejected by reasons for and against, supported & combatted by systematic opinions, might furnish matter for much meditation. It appears to me not difficult to conceive a Cause which acts on the Nervous system without carrying its action on the other systems, until the vital principle severely wounded, can no longer direct the functions of the other organs. From that time the animal economy falls into a confusion so much the more Anarchical, as the impellent principle is wounded, & the causes which derange it, are numerous & powerful.

Results of Post-Mortem-Examinations

The opening of Bodies comes to the support of this reasoning; this inspection demonstrates that,

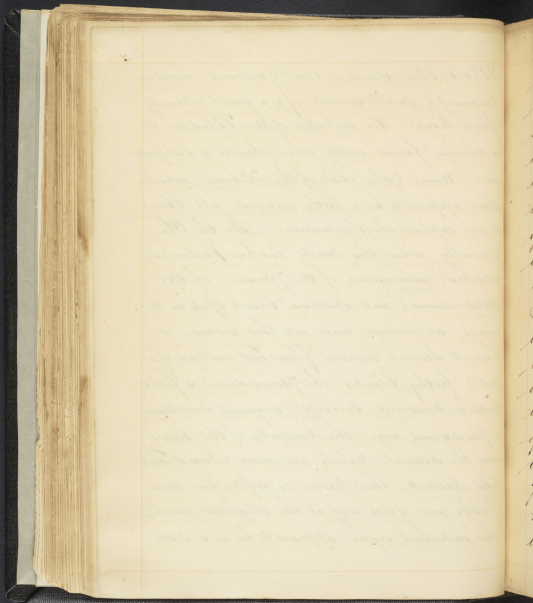
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it is not such and such a Function that is
 changed, such or such a Humour vitiated in
 preference to another, but the whole of the Animal-
 economy that is attacked & the entire mass of the
 Humours corrupted. - It is to this principal Cause
 that we must impute the variations that are
 observed in the march & in the effects of this
 Disease; variations which are evidently the
 result of the more or less intimate Connection,
 which on account of the peculiar Constitution of each
 individual, exists between the Nervous system,
 and the other Organs - The Stomach & intestinal
 canal in some, indeed, are distended & urged by
 an inflammable & foetid gas, their membranes
 especially the internal one, strewed with livid
 and gangrenous specks; in others the Liver &
 Spleen are considerably more voluminous than
 usual; the Vesicle of the Gall-Bladder and
 the other biliary Canals sometimes obstructed by

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Black Bile, which is thick & viscous, sometimes
 containing a small quantity of a green & extremely
 fluid liquor. — On inspection of the Bladder, it
 is always found empty when there is a suppres-
 sion of Urine; & also that of the Kidneys, which
 alone appear to be a little decayed; all these
 do not explain the phenomenon. In the Chest
 especially when this Cavity has been particularly
 attacked, emphysema of the pleura, of the
 Mediastinum, and sometimes Black spots on the
 Lungs; an incision made into this viscous, a
 brown & sanious Humour flows out instead of a
 red & frothy Blood; the Pericardium is filled
 with a sanious serosity & acquires sometimes
 a prodigious size; the Ventricles of the Heart
 and the Arterial Vessels are more relaxed and
 less elastic, their texture is softer and more
 flabby and gives way at the slightest touch;
 this important organ appears to be in a state



of Maceration; In the Brain the Sinuses contain a deeper coloured blood than usual; there are sometimes found bloody effusions under its enveloped; in Gine, the whole mucous texture is saturated with a yellow serosity, similar to that which runs from the surrounding parts of a Scarfed Carbuncle; all these symptoms are not common & are not ordinarily met with concentrated, but in few cases. In some I repeat it, it is the Abdomen that is affected, in others the Chest or Head; however these circumstances are not to be considered as certain; and if it was an affection that should be thought general, it would be the inflammation of the Stomach, in consequence of the frequent vomiting to which the principal number of Patients, are subject; however this symptom has sometimes failed; I have known Patients to die who had had Hemorrhage, yellowness

suppression of Urine & so great an oppression
as to be suffocated without having experienced
any nausea, or inclination to vomit & whose
stomachs were in their natural state.

In reflecting on the phenomena that the
Yellow Fever presents, it is astonishing what
an analogy is discovered between it &
the Scourge; all the difference (and doubtless
it is considerable) consists in the one arriving
to a crisis in seven & even in four days, whilst
the other requires four & sometimes seven months.

Causes of Yellow Fever

After having described the symptoms that
furnish us with a knowledge of yellow
fever, we must analyze the causes which
produce it. This research is so much the more
important, as it interests both a Medicum, & the
Administration; the former in pointing out the

17
most efficacious means to combat it, & the latter
to devise and establish such regulations as will
tend to prevent its introduction. Before proceeding
further it will be well to recollect two proposi-
tions, admitted in Natural Philosophy and
demonstrated to be true by experience & observation.

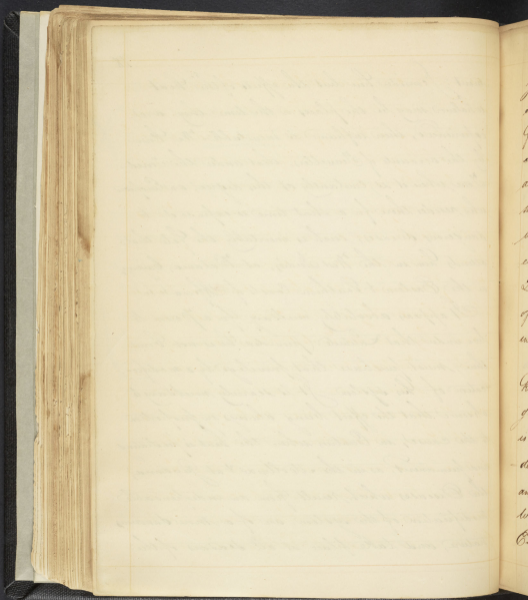
The first is, that a too powerful heat protracted
for a length of time, affects, changes & modifies
the Constitution of a Person not accustomed to
it: the second is, that the air may be so altered
and vitiated, as to cause, not only dangerous diseases,
but also the most sudden death; let us prove
by some examples the truth of these two propositions.

Experience has taught us that in climates where
the Thermometer of Fahrenheit rises to 80° in the
shade & continues at this height for some time,
the animal economy becomes more or less deranged.
I make for the moment, abstraction of the other
causes which may augment or attenuate this derange-

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ment; I consider here but the effects of the Heat
 whatever may be the places or the time they are
 experienced, their influence is inevitable. We know
 by the accounts of Travellers, that under the Torrid
 Zone, when it is constantly at this degree, an European
 who resides there for a short time is exposed to
 dangerous diseases; such is inevitably the Gale that
 attends him in the West Indies, at Batavia, Cayenne,
 on the Eastern & Southern Coasts of Africa &c.

It appears absolutely necessary for a person to
 live under that Latitude (provided he is not born
 there) must purchase that privilege by a modifica-
 tion of his system. It is scarcely necessary to
 observe that the effect being always in proportion
 to the cause, in Countries where the Heat is penitential
 and permanent, as in the Moluccas & at Peguana,
 the Diseases which result from an indispensable
 modification of the system, are of a more dangerous
 nature, and take place at all seasons of the

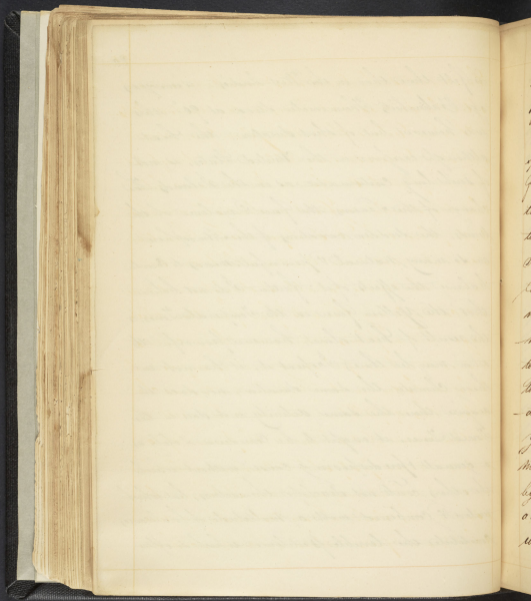


year. In climate a little more elevated, although situated under the Torrid Zone, they are much less fatal according to the place inhabited, and the season of the year when it is attacked; thus by a necessary consequence these Diseases should not make their appearance in the Temperate Zones until the Sun has arrived at his highest point of elevation & there diffuses his fire, as under the Torrid Zone produced by the almost continual presence of this planet, they should cease at its decrease, in fact they do in the United States, & also in Spain.

In the United States the Yellow Fever is always known to succeed uncommon hot weather & to cease generally as soon as the first frosts appear. It is well known that although New York & Philadelphia are situated under the Temperate Zone and are subject during winter to extreme cold weather, even more severe than is experienced in Europe under the same Latitude, greater heat

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is felt there than in the West Indies— Some years ago, Fahrenheit's Thermometer stood at 90° this was however but of short duration; the heat although excessive in the United States, is not of such long continuance as on the Islands— The change of the seasons, the force & violence of the winds, the sudden variations of the atmosphere are so many natural & powerful means to counterbalance the effects of it; further I do not believe that the Yellow Fever in the Temperate Zones, is the result of Heat alone, however powerful its action may be there; I repeat it, it has not in those climates the same duration, nor does it acquire there the same activity as it does in the Torrid Zones; it ought to be considered solely as a general & pre-disposing cause, without which the others could not develop themselves, but which united & combined with a multitude of local causes constitute the terrible pestilence which so often



has made such tremendous havoc in several
of the large Sea Port Towns in the United States.

I do not believe that the Yellow Fever is a
sporadic Disease susceptible of being transported
from one place to another, on the contrary I believe
that we should regard it as essentially attached
to the places where it develops itself. From this
I conclude that those Countries which do not
contain the causes capable of developing it, have
not commonly any thing to fear from their vicin-
age; but in places where every thing concurs
to give it a powerful energy, it is impossible
to be mistaken in its Epidemic & contagious char-
acter; this appellation does not accord with the
Yellow-Fever, if to obtain it, the presence of a
material Virus, palpable & Communicable alone
by the touch, is necessary. But if forced to
admit in this class, a rare & extraordinary disease
which has a Focus (although circumscribed in

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its limits from whence it diffuses itself, powerful
 causes which nourish it, a prodigious energy which
 affects all persons living in the circle of its activity
 and that it is impossible to avoid it otherwise.
 than by flight, we cannot forbear giving it
 to the Yellow Fever, whatever may be elsewhere
 the vehicle the means which serve to propagate
 it. I should remark here that the Epidemic Contagious
 nature of the Yellow Fever of the Temperate Zones, is
 a quality that is not found, especially in the same
 degree, in the Yellow Fever of the Torrid Zone. The
 reason of this phenomenon is owing I believe to the
 Atmospheric air, which should be regarded as
 the principal agent of its communication & which
 being less vitiated in the Islands, by the ab-
 sence of the local Cause, which alters its principle,
 on the Continent, constitutes this difference which exists
 not only for those who are acclimated, but also for
 those who are not acclimated. I will not attempt

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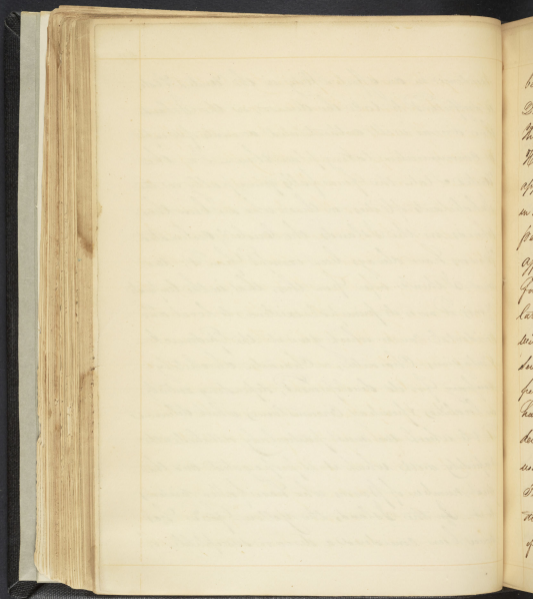
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to support the idea that this difference is invariable because of the principal Character of a Disease may be easily determined by observation, it is not the same case with the various grades in different places & at different times of the year, when they are the particular result of a multitude of causes and circumstances, whose combination might vary ad infinitum: however there are ^{more} marked traits in one Country than another, of this Malaria is the Epidemic Contagious Character, (I will not say exclusive) but inherent in the United Yellow Fever of the United States, in fact, although on the Continent of America it seldom or never continues beyond three months after Dog Days, the number of Persons who die of it, is much greater than in the Islands where it continues with more or less violence the whole year; in the United State its appearance is the signal for the cessation of all other Diseases, in the Islands, it excludes none: two Hours of

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residence in an affected City in the United States
 is sufficient to take the disease, in the Islands
 there are no well authenticated accounts of so rapid
 a communication taking place there. In the
 United States the Fever falls principally on the
 Inhabitants of Cities, on those who are born there.
 Whereas, in the Islands, the people are acclimated.
 Persons have always been exempt from it; we
 must I think infer from this, that in the temperate
 zones it owes its principal existence to local and
 accidental causes, which give it the Epidemic
 Contagious Character, a Character absolutely
 necessary for its development, depending entirely
 on localities & peculiar Circumstances, which determine
 it, & to which we must practically attribute the
 rapidity with which it is propagated and the
 great number of Persons who have fallen victims
 to it. In the Islands the Yellow Fever has
 never been considered a disease susceptible of



being propagated by proximity or Contact.—
 During the American Revolution more than three
 thousand Patients was distributed in the different
 Hospitals at Cape Francois, the Yellow Fever
 appeared more or less in all, without acquiring
 in any the Contagious Character; by the death of a
 person dying of this Disease was seen another
 afflicted with Dysentery or Diarrhoea, without
 however having the least effect whatever upon the
 latter; this is a circumstance I have frequently
 witnessed in the Hospitals at Havana and in
 several of the Windward Islands— although I
 persist in believing that the Causes of which I
 have already spoken are sufficient for the
 development of the Yellow Fever, & that it is
 useless to recur to the system of importation, yet
 I will not deny that a vessel whose crew is
 attacked by this Disease, the air from the hold
 of which is vitiated by the fermentation of the

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articles that compose the Cargo, arriving in a City subject to this Calamity, at a Season of the year the most favourable for its development, may be a means of propagating it; undoubtedly in this as in all other Diseases, the effect becomes Cause in its turn.

Diagnosis & Prognosis

The impotency of the Healing art was never, unfortunately, more evident than in this Disease. I do not believe that it is owing to its nature not being understood, but to the violence of the disease that we must attribute the inefficiency of the aids that Medicine furnishes. — It is not for want of boldness that Physicians have not succeeded in arresting its devastating. The Disciples of the doctrines of Hall, Cullen & Brown have not been more fortunate than those who adopted the doctrines of Boerhaave, van Swieten & Stoll.

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Every practitioner who has treated Patients labouring under the Yellow Fever, has cured some and lost a great number; and if from the inability of so many efforts, a single truth should be elicited, it would be that of the acknowledged inefficiency of all the Theries against a Disease which presents so many shades of difference. I will not attempt to point out an exclusive Remedy, a treatment applicable to all cases, the Disease forbids it, but I will mention what Remedies I have seen administered & what I think should be done. The Disease is some years more fatal than others; I have witnessed & studied the influence of the Local & accidental Causes on the Human Constitution; this study recommended by the Father of Medicine in one of his immortal works is certainly of the greatest importance. If in all Countries it constitutes an essential part of the Healing art, it is particularly so in the United States, where

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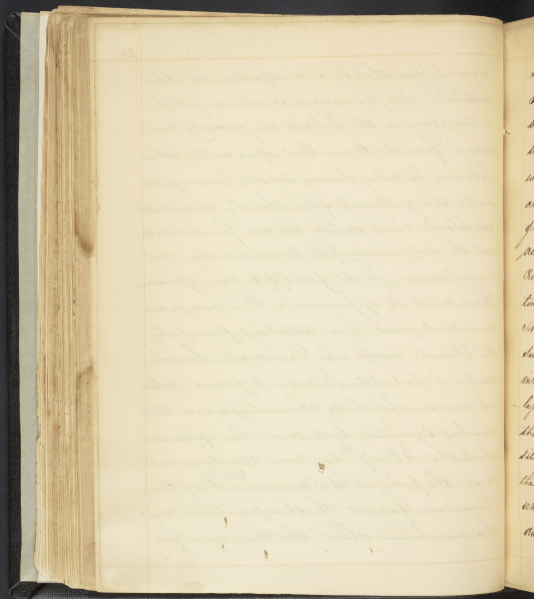
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every thing is so different from what it is in
 Europe; it is of consequence then to the progress
 of this art, to the reputation & glory of the Physician
 to pay strict attention to the Changes of the Atmos-
 phere; to Compare the degrees of heat of one year
 with another, to observe the quantity of rain, the
 force & variation of the winds, the quality of the
 soil we inhabit & the nature of the places surround-
 ing it, to reflect in fact, on the influence all these
 agents have on the Animal economy. — The Fever
 of the Islands is more or less fatal according to
 the situation of the places persons inhabit, the
 season of the year when he is attacked, the
 occupation he follows, & particularly the state of
 the mind. In the Epidemics which I have
 witnessed in the Islands as well as those in the
 United States, I have always observed some
 degree of difference between ^{them,} which without
 entirely changing the Character of the Disease

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required, notwithstanding a modification in the
 treatment. The predominant symptoms of the
 Yellow Fever in the Islands are generally hem-
 orrhages from the Nose, livid spots on the skin
 followed by cold clammy sweats, Riccough, &
 death, the yellowness of the skin is inconsiderable
 the black vomit occurs but in a few instances
 and the suppression of the Urine is a very rare
 circumstance. In the year 1794 the Yellow
 Fever made its appearance in St. Domingo in a
 most malignant form, attacking principally
 the British Troops who had made themselves
 masters of part of the Island. a general yellow-
 ness over the whole body & hemorrhages were the
 prevailing symptoms, both made their appearance
 about the 4th or 5th day, & were considered bad
 omens; the pulse at the Commencement of the
 Disease was frequent; the skin preserved its colour;
 there was absence about the third day of feeling



the pulse, a kind of gaseous dilatation of which I have already spoken. — on a few moderate bleedings according to the Constitution of the Patients were considered serviceable; some good effects were obtained from the vegetable & mineral acids, also from mild Vomiting, but nothing offered greater advantages than Bark given in large doses according to circumstances, rendered laxative by Cream of Tartar, or one of the Neutral Salts, a more tonic & active by Sal Ammoniac, Acine & Virginia Snake root combined; this treatment did not succeed so well at Fort au Prince, where the intermittent type was scarcely perceptible, doubtless on account of its less favourable situation; there were but few cases at Miribalais, a Parish situated on very elevated Table Land, where the air is pure & the heat moderate, circumstances which prove that this Disease loses its strength and malignity in proportion as the places are

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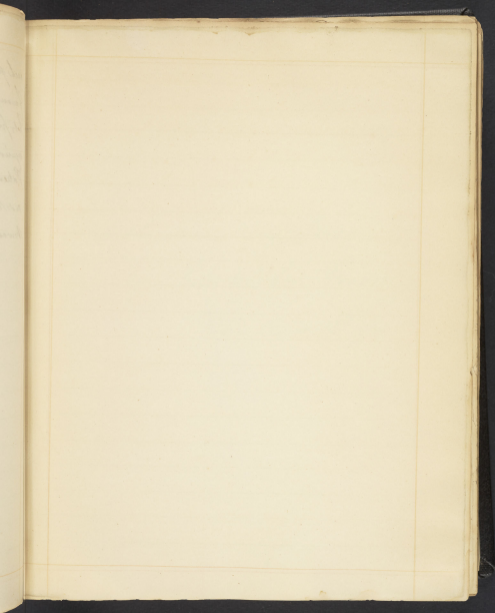
more a less elevated & cool that forms inhabit.
Some observations on the Treatment. In
 the year 1798 Cape Francois was severely visited
 by the yellow-fever from forty to fifty persons
 died daily, those who survived an attack of it
 were for a long time troubled with obstructions of
 the abdominal viscera & had a long & painful
 convalescence. This epidemic differed from that
 which was experienced at the same time at Fort
 Dauphin by the duration of the Disease which
 was prolonged until the eleventh or fourteenth
 day & sometimes even until the twentieth, by a
 more frequent & strong pulse & by the marked &
 sensible intermittent character at the commence-
 ment of the Disease, obscure & almost effaced in
 its condition; but with attention, the traces
 of it could be readily recognised; often the
 character was not perceptible at the pulse; but
 it could be distinguished by the constant return

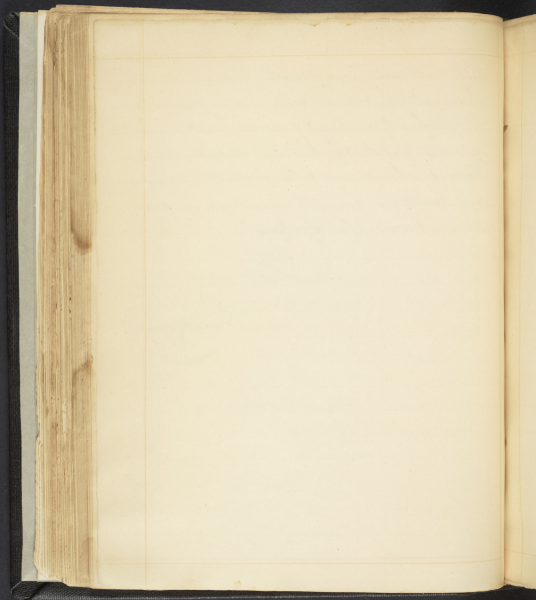
of some symptom such as Linnæa, vomiting,
 Linnæa or a more Considerable Linnæa &
 agitation; Tepid Baths, diluent drinks, mild
 aperitives, an Emetic about the third day, Con-
 tinued in moderate doses, For some time were
 the principal remedies & were found to operate
 favourably in many instances; great benefit
 was derived from Peruvian Bark given alone a
 rendered laxative by one of the Neutral salts
 according to the indications. Some patients vom-
 ited in small quantities occasionally, small flakes
 of a brown viscid matter, there was some
 yellowness, but little Hemorrhage, & no suppres-
 sion of the Urine, excepting that which depended
 on the atony of the Bladder which was soon
 relieved on the introduction of a Sound; there
 were observed in their place Considerable Coma-
 tose affections, Linnæa, subsisting tenderness
 and a disposition to sweat at the end of

each paroxysm, an evacuation which was
 favourable & critical when it was general,
 hot, profuse & resulting from the reaction; but
 injurious, fatal & foreshadowing the death of the
 Patient when it was cold, partial, viscid
 and resulting from the weakness of the
 nervous & vascular systems. —

Phila Dec^r 1st March 1825

M^r Abrams





in the morning

Philadelphia, Penna.

Sept. 10th 1861

